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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,154	02/26/2002	Takuya Yamamoto	108384-00043	3426

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EXAMINER

BARRECA, NICOLE M

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 06/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

10/082,154

Applicant(s)

YAMAMOTO ET AL.

Examiner

Nicole M. Barreca

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-11 are pending in this application.

Drawings

2. The drawings are objected to because in figure 2(e) "etching resist layer 8" should be designed as "internal circuits 4". A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities: p. 42, l. 21 recites "auxiliary layer 6". However layer 6 has been previously designated in the specification and drawings as "additional metal layer 6". Appropriate correction is required.

Claim Objections

4. Applicant is advised that should claim 5 be found allowable, claim 7 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. Also should claim 6 be found allowable, claim 8 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). While the step of removing the nickel or cobalt layer and the step of performing the interlayer connection layer are reversed as written, the claims are in open language and do not currently specify a

sequential order. Therefore claims 5 and 6 currently recite the same limitations as claims 7 and 8, respectively.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gaku (EP 1097806) in view of Mayhew (US 3734616).

7. Gaku discloses a method for making a copper clad printed wiring board. The copper-clad board is obtained by disposing a double-sided treated copper foil provided with a metallic treatment layer having a high absorption rate of a carbon dioxide laser energy. This metallic treatment allows a hole to be made by directly irradiating the surface of the copper foil with a carbon dioxide gas laser. The metallic treatment may be a nickel, cobalt or zinc plating or deposition. The double-sided copper foil having the metallic treatment and thermosetting resin layer laminate are formed under heat and pressure [0031]-[0032]. After the hole is made, the burrs are removed using mechanical polishing or chemical etching. Then the surface is copper plated (i.e. performing interlayer connection layer) and circuits are formed to prepare the printed wiring board by conventional methods [0035]-[0038].

Gaku is silent on the preferred thickness of the metallic treatment layer and does not disclose that the nickel layer is formed at a thickness of 0.08-2 μm , that the cobalt

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layer is formed at a thickness of 0.05-3 μm , or that the zinc layer is formed at a thickness of 0.03-2 μm . Gaku however does disclose the use of different thicknesses of the metallic treatment layers, all within the range of 1-4 μm , in the examples. It would be within the ordinary skill of one in the art to determine the optimal thickness for the metallic treatment layer in the method Gaku by routine experimentation, and to have the nickel layer is formed at a thickness of 0.08-2 μm , the cobalt layer is formed at a thickness of 0.05-3 μm , and the zinc layer is formed at a thickness of 0.03-2 μm , if required, because Gaku establishes that the thickness of the metallic treatment layer is a result effective variable by teaching that this thickness may vary within the range of 1-4 μm , and the discovery of an optimum value of a result effective variable is ordinary within the skill of the art (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Gaku is silent on the conventional method used to prepare the printed wiring board and does not disclose forming an etching resist, followed by exposure, development, circuit etching and resist removal. Mayhew teaches that the usual method for making printed circuit boards includes coating a layer of photoresist on a conductively clad insulating board, exposing the resist to light, developing the photoresist and the applying well known etching methods to leave only the circuit (col.1, 20-30). It would have been obvious to one of ordinary skill in the art to form the printed circuit board in the method of Gaku by forming a resist layer, followed by exposure, development, etching and resist removal because Gaku teaches that after the laser drilling and copper plating the printed circuit board is formed using conventional

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methods and Mayhew teaches that these claimed steps are the usual method for producing a printed circuit board.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gaku in view of Mayhew as applied to claim 1 above, and further in view of Kossler (US 4025358).

9. Gaku is silent on how the nickel layer is removed and does not disclose removing the nickel layer using sulfuric acid, sulfuric acid/nitric acid or sulfuric acid/nitrobenzenesulfonic acid. Kossler teaches that it is known that nickel layers may be removed using a bath of sulfuric and nitric acids (col.1, 20-21). It would have been obvious to one of ordinary skill in the art to remove the nickel layer in the method of Gaku in view of Mayhew using sulfuric and nitric acid because Kossler teaches that it is known to remove nickels layers using a bath of sulfuric and nitric acids.

10. Claims 5-11 are rejected under 35 U.S.C. 103(a) as being obvious over Gaku (EP 1097806) in view of Mayhew (US 3734616) and Kotaoka (US 6319620).

The applied reference (Kotaoka) has common inventors and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37

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CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(I)(1) and § 706.02(I)(2).

The teachings of Gaku and Mayhew have been discussed previously. Gaku and Mayhew do not disclose forming an organic layer, repeatedly or alternately, on the surface of the copper foil, or that this organic layer is formed from one or more of a nitrogen-containing compound, a sulfur-containing compound and carboxylic acids. Kataoka teaches that an organic layer comprising at least one member selected from triazoles, such as benzotriazole (n-containing), thiazoles such as mercaptobenzothiazole (s-containing) and imidazoles formed between a copper foil and a metal layer will form a release layer which has an optimal bond strength, thereby preventing the layers from separating during handling and lamination but also allowing easy removal after processing (col.3, 30-col.4, 55). The examples disclose that the copper foil is dipped into the organic solutions for the desired amount of time. It would have been obvious to one of ordinary skill in the art to form an organic layer, comprising at least one member selected from triazoles, such as benzotriazole (n-containing) and thiazoles such as mercaptobenzothiazole (s-containing), between the copper foil and the metallic

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treatment layer in the method of Gaku in view of Mayhew because Kataoka teaches that this will form an organic release layer with optimal bond strength.

11. Claims 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gaku in view of Mayhew and Caule (US 3833433).

The teachings of Gaku and Mayhew have been discussed previously. Gaku and Mayhew do not disclose an organic layer on the surface of the copper foil, or that this organic layer is formed from one or more of a nitrogen-containing compound, a sulfur-containing compound and carboxylic acids. Caule teaches that in the manufacture of printed circuit boards, the copper foil normally will have a film of benzotriazole on it in order to prolong the shelf life before the manufacturing process. It would have been obvious to one of ordinary skill in the art that the copper foil used in the method of Gaku in view of Mayhew had on it an organic layer of nitrogen-containing benzotriazole because Caule teaches that copper foil used in the manufacture of printed circuits boards normally has a film of benzotriazole on it in order to prolong shelf-life.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Chen (US 2002/0192486) and JP 2001-262372 disclose treating a copper film with a layer of nickel or cobalt in order to allow the copper foil to be directly drilled with a CO₂ laser. JP 2001-239386 and JP 2001-347599 disclose plating a layer of nickel on a copper foil in order to directly form a hole in the copper foil using a CO₂ gas laser, while JP 11-186678 discloses using a zinc plated layer on copper foil for the

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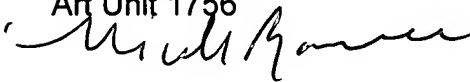
same purpose. JP 2001-308544 is in the same family as the present application, while US 2002/0081530 is its Patent Application Publication.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicole M. Barreca whose telephone number is 703-308-7968. The examiner can normally be reached on Monday-Thursday (8:00 am-6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 703-308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Nicole Barreca
Patent Examiner
Art Unit 1756



May 30, 2003